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09/853,622	05/14/2001	Kazuhiko Hayashi	NEC2370-US	7276

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EXAMINER

RENNER, CRAIG A

ART UNIT	PAPER NUMBER
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2652

17

DATE MAILED: 08/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

09/853,622

**Applicant(s)**

HAYASHI ET AL.

**Examiner**

Craig A. Renner

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 4-21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 14.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Claims 11-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on 27 May 2003.
2. Claims 4-10 and 20-21 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to one or more non-elected inventions/species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 3 September 2003.

### *Drawings*

3. The drawings were received on 23 January 2004. These drawings are accepted.

### *Specification*

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed. The following is suggested:

--MAGNETORESISTIVE EFFECT SENSOR WITH BARRIER LAYER  
SMOOTHED BY COMPOSITION OF LOWER SHIELD LAYER--.

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5. The disclosure is objected to because of the following informalities:

In line 2 in each of claims 2 and 3, "said lower shield" should be changed to --said lower shield layer-- in order to more clearly refer back to that set forth in line 3 of independent claim 1. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In lines 2-3 of claim 3, "wherein said lower shield is made of a material of CoZrTa, with a CoZrTaCr alloy; serving as a base layer for said free layer" is indefinite as it is misdescriptive of the disclosure, which teaches/shows that "the lower shield be made of a material based on CoZrTa and CoZrTaCr alloy." See page 24, lines 5-7, referenced on page 17 of the REMARKS, filed 19 May 2004.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Dill et al. (US 5,898,548).

Dill teaches a magnetoresistive effect sensor using a shielded-type magnetoresistive effect element comprising a magnetoresistive effect film (100) above a lower shield layer (S1), the film comprising a basic configuration that is a combination of a free layer (132), a barrier layer (120), and a fixed layer (118), wherein either the barrier layer is formed on the free layer, and the fixed layer is formed on the barrier layer, or the barrier layer is formed on the fixed layer, and the free layer is formed on the barrier layer (as shown in FIGS. 4(A-B) and 5, for instance), the barrier layer inheriting a roughness of the lower shield layer (inherently due to the fact that the barrier layer is formed on the lower shield layer), wherein a sensing current (I) flows substantially perpendicularly with respect to the magnetoresistive effect film (as shown in FIG. 4A, for instance), and wherein either an amorphous material or a microcrystalline material is used in the lower shield layer (lines 40-44 in column 8, for instance, i.e., "CoZrNb" is an amorphous material, for instance), which smoothes the lower shield layer (inherently to some extent due to the fact that the composition is the same as

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that set forth in claim 1), thereby increasing the smoothness of the barrier layer (inherently due to the fact that the barrier layer is formed on the lower shield layer and thereby inherits the roughness/smoothness of the lower shield layer).

10. Claims 1 and 3 are rejected under 35 U.S.C. 102(e) as being anticipated by Ishiwata et al. (US 6,452,204).

Ishiwata et al. (US 6,452,204) teaches a magnetoresistive effect sensor using a shielded-type magnetoresistive effect element (as shown in Fig. 11, for instance) comprising a magnetoresistive effect film (100/Fig. 2C, for instance) above a lower shield layer (31), the film comprising a basic configuration that is either a combination of a free layer (13), a barrier layer (15A), and a fixed layer (16), wherein either the barrier layer is formed on the free layer, and the fixed layer is formed on the barrier layer, or the barrier layer is formed on the fixed layer, and the free layer is formed on the barrier layer (as shown in Fig. 2C, for instance), the barrier layer inheriting a roughness of the lower shield layer (inherently due to the fact that the barrier layer is formed on the lower shield layer), wherein a sensing current flows substantially perpendicularly with respect to the magnetoresistive effect film (line 1 of the abstract, for instance, i.e., a "tunneling magnetoresistance transducer" has a sensing current thereof flowing substantially perpendicularly with respect to the magnetoresistive effect film), and wherein either an amorphous material or a microcrystalline material is used in a lower shield layer (lines 12-13 in column 11, for instance, i.e., "CoTaZrCr" is an amorphous material, for instance), which smoothes the lower shield layer

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(inherently to some extent due to the fact that the composition is the same as that set forth in claim 1), thereby increasing the smoothness of the barrier layer (inherently due to the fact that the barrier layer is formed on the lower shield layer and thereby inherits the roughness/smoothness of the lower shield layer) [as per claim 1]; wherein the lower shield is made of a material of CoZrTa, with a CoZrTaCr alloy (lines 12-13 in column 11, for instance); serving as a base layer for the free layer (as well as the other layers of the magnetoresistive effect film, as shown in FIG. 11, for instance) [as per claim 3].

11. Claims 1-2 are rejected under 35 U.S.C. 102(e) as being anticipated by Hayashi et al. (US 6,490,139).

Hayashi teaches a magnetoresistive effect sensor using a shielded-type magnetoresistive effect element (as shown in Fig. 3A, for instance) comprising a magnetoresistive effect film (includes 24-26, for instance) above a lower shield layer (21), the film comprising a basic configuration that is either a combination of a free layer (26), a barrier layer (25), and a fixed layer (24), wherein either the barrier layer is formed on the free layer, and the fixed layer is formed on the barrier layer, or the barrier layer is formed on the fixed layer, and the free layer is formed on the barrier layer (as shown in Fig. 3A, for instance), the barrier layer inheriting a roughness of the lower shield layer (inherently due to the fact that the barrier layer is formed on the lower shield layer), wherein a sensing current flows substantially perpendicularly with respect to the magnetoresistive effect film (between electrodes 22 and 29), and wherein either an amorphous material or a

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microcrystalline material is used in a lower shield layer (lines 52-59 in column 8, for instance, i.e., "CoZrTa," for instance, is an amorphous material), which smoothes the lower shield layer (inherently to some extent due to the fact that the composition is the same as that set forth in claim 1), thereby increasing the smoothness of the barrier layer (inherently due to the fact that the barrier layer is formed on the lower shield layer and thereby inherits the roughness/smoothness of the lower shield layer, see also lines 23-25 and 50-53 in column 7, for instance) [as per claim 1]; wherein the lower shield comprises a crystal grain diameter of 6.2 nm or smaller (lines 52-59 in column 8, for instance, i.e., "CoZrTa," for instance, is an amorphous material and therefore has a crystal grain diameter of 0 nm, which falls within the range of 6.2 nm or smaller) [as per claim 2].

### ***Response to Arguments***

12. Applicant's arguments filed 19 May 2004 have been fully considered but they are not persuasive.

The applicant argues that "There is no recognition in Dill of the significance of surface roughness of the barrier layer, nor disclosure of technology beyond the prior art for reducing this surface roughness by smoothing the layers below." This argument, however, is not found to be persuasive for the following: The claims merely set forth an inherent result of using either an amorphous material or a microcrystalline material in a lower shield layer. As Dill also uses either an amorphous material or a microcrystalline material in a lower



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shield layer, it will also exhibit the same inherent result, i.e., reducing the roughness of the barrier layer. See the rejection in paragraph 9, *supra*. A patent cannot be granted for an applicant's discovery of a result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art, *In re Best*, 562 F.2d 1252, 195 USPQ 430 (CCPA 1977) and *In re Wilder*, 429 F.2d 447, 166 USPQ 545 (CCPA 1970).

The applicant also contends that "there is no disclosure [in Ishiwata] of either the significance of roughness of layers underlaying the barrier layer or technology for controlling and reducing this roughness." This argument, however, is not found to be persuasive for the following: The claims merely set forth an inherent result of using either an amorphous material or a microcrystalline material in a lower shield layer. As Ishiwata also uses either an amorphous material or a microcrystalline material in a lower shield layer, it will also exhibit the same inherent result, i.e., reducing the roughness of the barrier layer. See the rejection in paragraph 10, *supra*. A patent cannot be granted for an applicant's discovery of a result, even though it may be unexpectedly good, which would flow logically from the teaching of the prior art. See *In re Best*, *supra*, and *In re Wilder*, *supra*.

13. Applicant's arguments with respect to claim 2 have been considered but are moot in view of the new ground of rejection, which was necessitated by the amendments to independent claim 1 from which claim 2 depends.

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***Conclusion***

14. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Craig A. Renner whose telephone number is (703) 308-0559. The examiner can normally be reached on Tuesday-Friday 7:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T. Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Craig A. Renner  
Primary Examiner  
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CAR